Objectives Checklist

You are done studying when you can check off all of these statements (page numbers where extra practice can be found are given):

- ☐ I can explain real world phenomena using the kinetic molecular theory (no need to memorize exactly, just be able to summarize) (pp. 452-453)

- ☐ I know when to use standard temperature and pressure (STP conditions will be given on test) and can convert between different units of pressure. (p. 453)

- ☐ I understand the relationship between pressure and volume mathematically and practically – Boyle's Law (pp. 454-456)

- ☐ I understand the relationship between temperature and volume both mathematically and practically – Charles' Law (pp. 460-461)

- ☐ I can solve problems involving pressure, volume, and temperature (combined, Boyle's, and Charles' Law) and I know how to rearrange each equation to solve for the variable I need (combined gas law will be given on test) (p. 463)

- ☐ I can solve for partial pressures of a system using Dalton's Law of Partial Pressures (pp. 457-459)

- ☐ In my calculations, I know how to account for the vapor pressure of water when calculating the pressure of a dry gas collected over water (pp. 457-459)

- ☐ I know what units to use when solving problems using the ideal gas law (HINT: what are the units of 'R'? They will be posted for the test) (pp. 479-481)

- ☐ I can calculate the molar mass and density of a substance using the ideal gas law (equation for density only will be given on test) (pp. 482-483)

- ☐ I know how to calculate percent error in an experiment (you do need to memorize this equation!) (pp.34-35)

- ☐ I can determine the volume of a gas produced in a reaction given the mass amounts of the reactants (limiting reactants and ideal gas law! Mass A → Volume A) (pp. 485-493)

- ☐ I can determine how many moles of a reactant I started with given the volume of the gas product that was formed (Volume A → Mass B) (pp. 485-493)

Pre-AP Gas Laws Test Review

$P_1V_1=P_2V_2$, $\frac{P_1V_1}{T_1}=\frac{P_2V_2}{T_2}$, $\frac{V_1}{T_1}=\frac{V_2}{T_2}$, $PV=nRT$, $d=\frac{PM}{RT}$

$R = 0.0821 \frac{L \cdot atm}{mol\ K}$

Complete on a separate sheet of paper. Show ALL work to get full extra credit points.

1. Summarize the six postulates of the Kinetic Molecular Theory

2. Describe the relationship between pressure and volume and temperature and volume

3. A scuba diving vest is filled to a volume of 1.3 liters at a pressure of 540 mmHg where the temperature is 300K what will the volume of air be in the vest when the diver dives to a depth of 60 feet where the temperature is 20°C and the pressure is 3atm?

4. A CO_2 container has a volume of 60 liters and is filled with 3 moles of gas at a temperature of 60 °C, what is the pressure inside the container?

5. A sample of butane gas is collected over water at STP conditions. What is the volume of the gas if 22 g of butane are released? (MM C_8H1_0 = 106 g/mol) What is the partial pressure of the butane gas if the vapor pressure at STP is 4.6 mmHg?

6. What is the density of oxygen gas at 2atm and 35 °C?

7. 10 g of an unknown gas occupies a 5 L container at a pressure of 760 mmHg at a temperature of 298 K. What is the molar mass of the unknown gas?

8. In another experiment the gas from problem #7 was determined to be CO_2. Using the value you calculated from #7 what was the % error in the calculation for the molar mass?

9. Electrolysis is the decomposition of water. How many grams of water need to be decomposed in order to form 5L of oxygen gas?

$$\underline{2}H_20 \rightarrow \underline{2}H_2 + O_2$$

10. How many liters of CO_2 can be produced if 100g of glucose (C6H12O6) react with 15g of oxygen at 20 °C and 1.5 atm? (HINT: this is a limiting reagent problem AND ideal gas law problem…is the equation below balanced?

$$C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_2O$$

What volume would the amount of gas from above occupy at STP?